

Research Newsletter

Responsive - Accessible - Relevant

A MESSAGE FROM THE RESEARCH DIRECTOR

By: Cameron Kergaye, PhD, PMP, PE

Our summer begins with new research projects that have been awarded through our Spring research workshop. A total of 59 problem statements were submitted for consideration and sixteen were subsequently selected for funding beginning this month. Many thanks to those who spent time analyzing our transportation challenges and networking with UDOT professionals on potential solutions. As usual, there were more great ideas than available funding.

I also want to re-congratulate Barry Sharp as our UTRAC Trailblazer. Barry tested hundreds of new products for Research and provided helpful solutions throughout his career at UDOT.

At the national level, UDOT recently applied for three SHRP2 projects for implementation in Utah. This is the fourth round of a TRB-FHWA-AASHTO joint research program that awards DOTs the opportunity to implement over 100 potential transportation solutions in terms of safety, renewal, capacity and reliability. UDOT was previously awarded two implementation projects in renewal and one in reliability. For the new round, UDOT applied for one safety and two capacity projects. Applicants for round four projects will be awarded in early August.



2014 Trailblazer recipient Barry Sharp with David Stevens of UDOT's Research Division

Further national research relevant to UDOT is NCHRP's new FY2015 research. TRB is about to finalize their selection of problem statements submitted by UDOT and other government agencies last year. There were a total of 61 problem statements balloted for funding by the AASHTO Board of Directors, of which 27 were ranked by UDOT as highly useful to our state. This represents over \$15 million for transportation research related to both our local and national needs.

In This Issue: (click on desired article, click on logo at top to return to this page)

RESULTS OF THE 2014 RESEARCH WORKSHOP (UTRAC)	2
HIGHLIGHTS FROM THE 2013 ANNUAL EFFICIENCIES REPORT	3
POOLED FUND: PERFORMANCE-BASED ASSESSMENT OF LIQUEFACTION.....	4
400 SOUTH CORRIDOR ASSESSMENT	5
GROUTED SPLICE SLEEVE CONNECTORS FOR ABC BRIDGE JOINTS IN HIGH-SEISMIC REGIONS	6
COMPARISON OF WINTERTIME ASPHALT AND CONCRETE PAVEMENT SURFACE TEMPERATURES IN UTAH.....	8
RESEARCH DIVISION COMINGS AND GOINGS	10
CALENDAR OF EVENTS	11

Completed and Active Research Available at: www.udot.utah.gov/go/research

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Results of the 2014 Research Workshop (UTRAC)

Projects have been selected for FY15 funding from the 2014 UDOT Research Workshop held on April 30th.

Fifty-nine problem statements were submitted this year for the UDOT Research Workshop. Of these, 16 will be funded as new research projects through the Research Division. Some submitted problem statements will be funded directly by other divisions.

The workshop serves as one step in the research project selection process which involves UDOT, FHWA, universities, and others. UDOT Research Division solicited problem statements for six subject areas: Materials & Pavements, Maintenance, Traffic Management & Safety, Structures & Geotechnical, Preconstruction, and Planning.



Traffic Management & Safety breakout session

At the workshop, transportation professionals met to prioritize problem statements in order to select the ones most suitable to become research projects.

After the workshop, UDOT Research Division staff reviewed prioritization and funding for each recommended problem statement with division and group leaders and presented the list of new projects to the UTRAC Council.

The selected new projects include:

- Asphalt Mix Fatigue Testing using the Asphalt Mix Performance Tester (CMETG)
- Developing a Low Shrinkage, High Creep Concrete for Infrastructure Repair (USU)
- Prevention of Low Temperature Cracking of Pavements (UofU)
- Review and Specification for Shrinkage Cracks of Bridge

- Decks (UofU)
- Incorporating Maintenance Costs and Considerations into Highway Design Decisions (UofU)
- Unconventional Application of Snow Fence (UDOT)
- Statistical Analysis and Sampling Standards for MMQA (UofU)
- National Best Practices in Safety (UDOT)
- I-15 HOT Lane Study - Phase II (BYU)
- Characteristics of High Risk Intersections for Pedestrians and Cyclists-Part 3 (Active Planning)
- Safety Effects of Protected and Protected/Permitted Left-Turn Phases (UofU)
- Development of a Concrete Bridge Deck Preservation Guide (BYU)
- TPF-5(272) Evaluation of Lateral Pile Resistance Near MSE Walls at a Dedicated Wall Site (BYU)
- Active Transportation - Bicycle Corridors vs. Vehicle Lanes (BYU)
- Investigating the Potential Revenue Impacts from High-Efficiency Vehicles in Utah (UDOT)
- Developing a Rubric and Best Practices for Conducting Bicycle Counts (Active Planning)

At the April 30th workshop, Dr. Michael Darter of Applied Research Associates gave an inspiring keynote address on collaboration between state DOTs and academia in developing innovative ideas. Also at the workshop, Barry Sharp, recently retired from UDOT, was presented with the UTRAC Trailblazer Award for his significant contributions towards improving UDOT research processes and the use of innovative products in transportation. Russ Scovil was our workshop coordinator and did a great job.

We appreciate everyone's participation in the workshop process. The new research projects can start as early as July 2014 in coordination with UDOT Research staff and champions.

To see details on the new projects and all submitted problem statements, visit the UDOT Research Division website. For more information contact David Stevens at davidstevens@utah.gov.

Highlights from the 2013 Annual Efficiencies Report

Efficiencies within UDOT often generate cost savings for the public and the Department through better utilization of resources and innovative technologies. At the end of each year, UDOT prepares an efficiencies report which summarizes key efficiency initiatives from the year. The annual report fulfills a requirement for UDOT to describe the efficiencies and significant accomplishments achieved during the past year to the State Legislature. UDOT Senior Leaders use the report in presentations during legislative committee meetings.

Following are the key efficiency initiatives summarized in the FY 2013 report:

- ◆ Bicycle Detection and Pavement Markings
- ◆ Flashing Yellow Arrow for Left Turns
- ◆ ReflectORIZED Yellow Tape on Signal-Head Back Plates
- ◆ Portable Weather Station for Advance Warning of Debris Flows
- ◆ Audio Over IP Highway Advisory Radio in Utah County
- ◆ Commercial Vehicle Bypass (PrePass)
- ◆ Partnered Fiber-Optic Cable Installations
- ◆ Resolving Utility Conflicts through a Preserve and Protect Approach
- ◆ Utah Prairie Dog Programmatic Agreement
- ◆ Performance-Driven Programming
- ◆ Energy-Efficient LED Lighting Upgrades in Department Facilities
- ◆ iMAP GIS Tool
- ◆ Improved Decision Making Using Mobile Data Collection
- ◆ MMQA Data Collection Teams

One example from the 2013 report is the improved safety at intersections that are changed from Protected/Permissive to Flashing Yellow Arrow left-turn phasing. UDOT and other jurisdictions throughout Utah are among the first in the nation to implement flashing left-turn arrows. Potential annual public cost savings per installation ranges from \$17,745 (property damage only) to \$2,769,000 (fatality) from reduced crashes.



Flashing Yellow Arrow left-turn phasing

Another example from 2013 is the use of a portable weather station to provide advance warning of debris flows and flooding at the Seeley burn scar near SR-31 in Huntington Canyon. Using the station contributed to overall safety, minimized equipment losses, reduced response time, and minimized impact to commerce. An estimated \$50,000 was saved through reduced risk to field crews, motorists, and equipment.



Debris flow across SR-31 in Huntington Canyon

UDOT Research Division staff coordinate each year with UDOT Senior Leaders and the Communications Office to collect and compile write-ups on the past year's key efficiency initiatives. This process will start again in August for FY 2014. We look forward to receiving "game changing" efficiency topics from all Regions and Groups that will potentially be included in the annual report.

The 2013 and earlier annual reports are available online at www.udot.utah.gov/go/efficiencies. For more information, contact David Stevens (davidstevens@utah.gov) of UDOT's Research Division.

Pooled Fund: Performance-Based Assessment of Liquefaction

A new study led by UDOT and funded through the FHWA Transportation Pooled Fund Program began in March and is progressing well. The study is number TPF-5(296), entitled "Simplified SPT Performance-Based Assessment of Liquefaction and Effects." A research team from Brigham Young University (BYU) is performing the two-year study. Other state DOTs participating in the study include Alaska, Connecticut, Idaho, Montana, and South Carolina.

Liquefaction of loose, saturated sands results in significant damage to buildings, transportation systems, and lifelines in most large earthquake events. Liquefaction and the resulting loss of soil shear strength can lead to lateral spreading and seismic slope displacements, which often impact bridge abutments and wharfs, damaging these critical transportation links at a time when they are most needed for rescue efforts and post-earthquake recovery.

Most commonly used liquefaction and ground deformation evaluation methods are based on the concept of deterministic hazard evaluation, which is related to the maximum possible earthquake from nearby faults. Recent advances in performance-based geotechnical earthquake engineering have introduced probabilistic uniform hazard-based procedures for evaluating seismic ground deformations within a performance-based framework, from which the likelihood of exceeding various magnitudes of deformation within a given time frame can be computed. However, applying these complex performance-based procedures on everyday projects is generally beyond the capabilities of most practicing engineers.

The objective of the new study is to create and evaluate simplified performance-based design procedures for the *a priori* prediction of liquefaction triggering, lateral spread displacement, seismic slope displacement, and post-liquefaction free-field settlement using the standard penetration test (SPT) resistance. Many of the analysis methods used to assess liquefaction hazards are based on SPT resistance values since the SPT is commonly used in site soil characterization for building, transportation, and lifeline projects.

This study represents a worthwhile pilot study

which could prepare the way for additional research with the U.S. Geological Survey to further the use of the simplified, performance-based method.

The key to the simplified method is the use of a reference soil profile in development of liquefaction loading maps which are then used with the site's soil data to estimate effects of liquefaction. An example map is shown in Figure 1, where CSR^{ref} represents a uniform hazard estimate of the seismic loading that must be overcome to prevent liquefaction triggering, if the reference soil profile existed at the site of interest.

Derivations for simplified performance-based liquefaction triggering and lateral spread displacement models have been completed in the study. Validation efforts have shown that the simplified results approximate the full performance-based results within 5% for most sites that were evaluated.

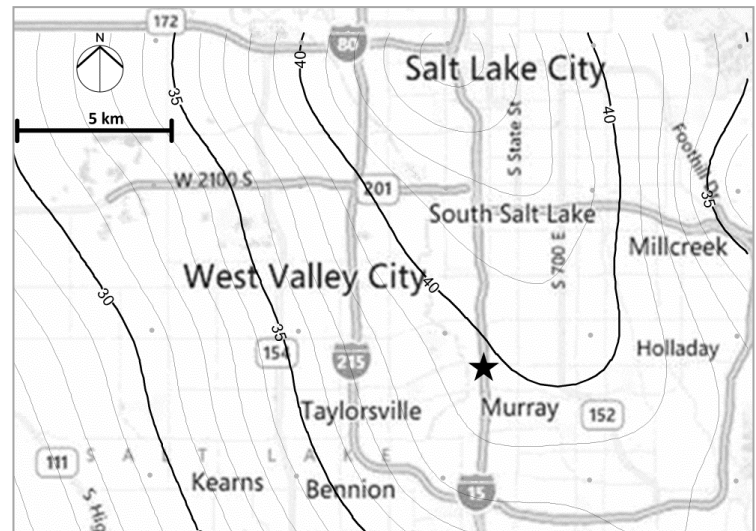


Figure 1: Liquefaction loading map (return period = 1,033 years) showing contours of CSR^{ref} (%) for a portion of Salt Lake Valley, Utah

A summary of the study work plan and copies of current reports from the study are available at the [TPF-5 \(296\) study website](#). For more information, contact Dr. Kevin Franke (kevin_franke@byu.edu) of BYU, Darin Sjoblom (dsjoblom@utah.gov) of the UDOT Geotechnical Division, or David Stevens (davidstevens@utah.gov) of the Research Division.

400 South Corridor Assessment

This study evaluated current and future traffic and transit performance along the light rail transit (LRT) corridors within the University of Utah area, 400 South and Downtown Salt Lake City before and after an introduction of an additional LRT line. The analysis of different scenarios and on different network levels was performed using VISSIM microsimulation coupled with Siemens Next-Phase Software-in-the-Loop traffic controllers. The scenarios were evaluated for three different target years: 2013/2014, 2020 and 2025. Additional scenarios included alternative intersection configuration, with modified left turn operations at intersections of 400 S and Main, 400 S and State, and 400 S and 700 E.

The analysis showed that the additional LRT line did not have significant impacts on traffic and transit operations. The highest impacts were experienced at intersections close to the Downtown area, mainly 400 S and State Street, and 400 S and Main Street, and N Temple and 400 W. The study also recommended potential signal improvements at these locations consisting of rephasing, retiming and modifying LRT preemption. The analysis also showed that it might be beneficial removing the shared lane sites at intersections along 400 S, since close to 70% of drivers are using the non-shared left turn lane, resulting in sub-optimal intersection operations.



Figure 2. Main Street and 400 S Intersection in Simulation

This study was coordinated between UDOT, Utah Transit Authority, and other agencies. For more information, please contact Milan Zlatkovic from the University of Utah's Traffic Lab (milan@trafficlab.utah.edu) or Kevin Nichol of the UDOT Research Division (knichol@utah.gov).

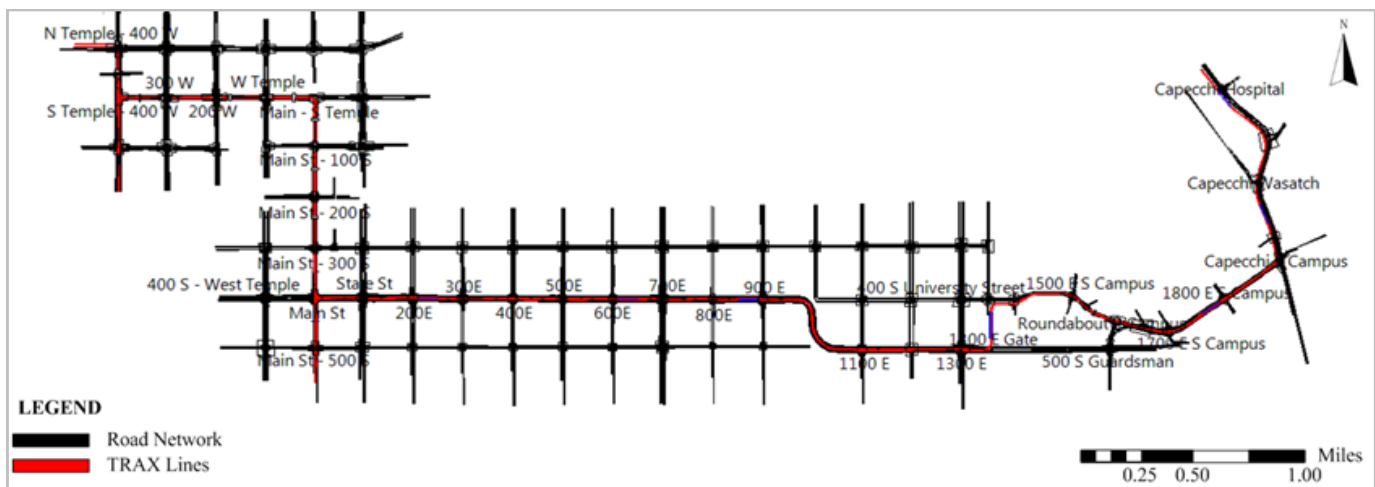


Figure 1. Roadway and LRT Study Network

Grouted Splice Sleeve Connectors for ABC Bridge Joints in High-Seismic Regions

In recent years, the Accelerated Bridge Construction (ABC) method has received attention in regions of moderate-to-high seismicity. Prefabrication of bridge structural components is a highly effective method in this process and one of the ABC methods for Prefabricated Bridge Elements and Systems (PBES) advanced by the Federal Highway Administration. Joints between such precast concrete components play an important role in the overall seismic performance of bridges constructed with the ABC method. Research has been carried out at the University of Utah to investigate potential ABC joint details for bridges located in high-seismic regions. A connector type, referred to as a Grouted Splice Sleeve (GSS), is studied for column-to-footing and column-to-cap beam joints. Two GSS connectors commonly used in buildings were utilized in this study, as shown in **Fig. 1**. The column-to-cap beam joints used a GSS connector where one bar was threaded into one end and the other bar was grouted into the opposite end (denoted as FGSS), as shown in **Fig. 1(a)** and **Fig. 1(c)**. The column-to-footing joints incorporated another type of GSS where the bars were grouted at both ends (denoted as GGSS), as shown in **Fig. 1(b)** and **Fig. 1(d)**.

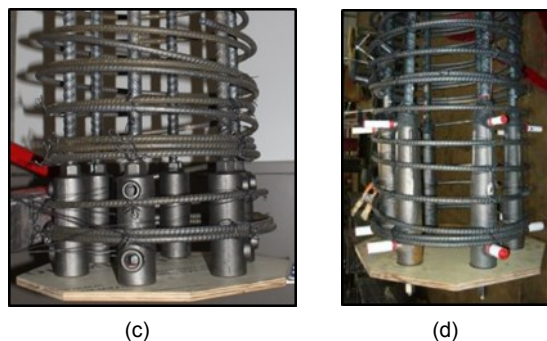
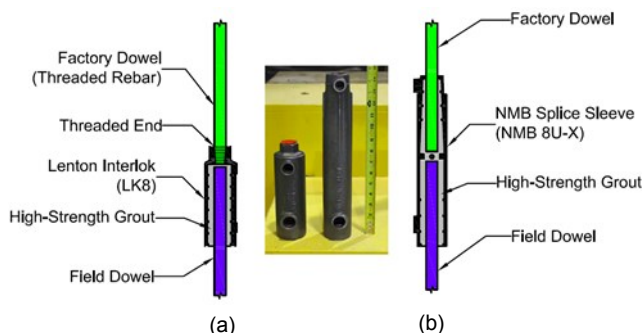


Figure 1. Two types of GSS connectors used: (a) FGSS, (b) GGSS, (c) FGSS-1, (d) GGSS-1.

Three precast alternatives in addition to one conventional cast-in-place half-scale model were constructed for each category, as shown in **Fig. 2**; the column-to-cap beam joints were tested upside down. The GSS connectors were placed in the column base (GGSS-1) or column top (FGSS-1) in the first alternative. The location of the GSS connectors changed to the top of the footing (GGSS-2) and bottom of the cap beam (FGSS-2) to study the performance of the joints when the GSS connectors were outside the plastic hinge zone of the column in the second alternative. The dowel bars in the footing and the cap beam were debonded over a length equal to eight times the rebar diameter ($8d_b$) for the third alternative in both categories, while the GSS connectors were embedded in the column base (GGSS-3) or column top (FGSS-3). The last specimen type was the cast-in-place joint, in which continuous bars from the footing and cap beam were used to build the columns without bar splices (GGSS-CIP and FGSS-CIP).

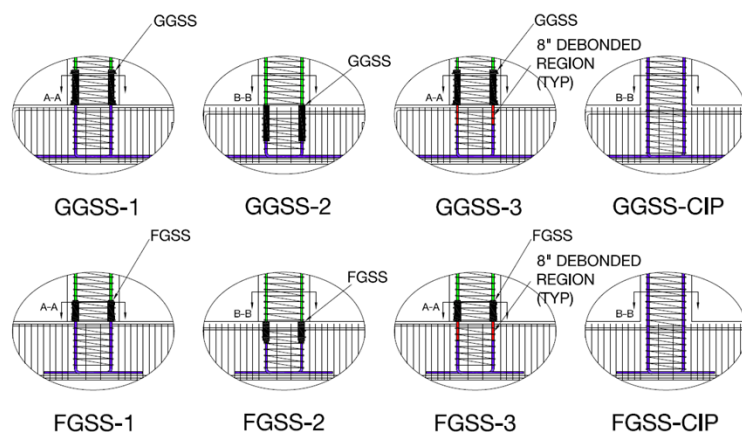
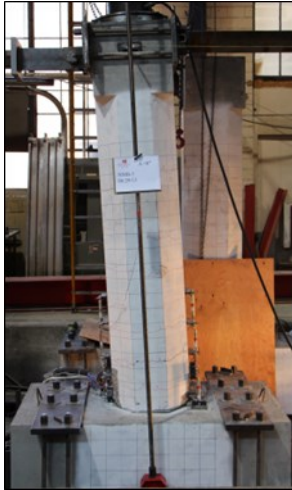


Figure 2. Configuration of test specimen alternatives.

Experimental results under cyclic quasi-static loading showed that the performance of all joints was satisfactory in terms of strength and stiffness characteristics. However, the hysteretic performance and displacement ductility capacity of the specimens were distinct. Improved seismic response was observed when the GSS connectors were located inside the footing (GGSS-2) and the cap beam (FGSS-2) rather than the corresponding column end. The debonded rebar zone enhanced the ductility level and the hysteretic performance of the joints. This technique was found to be highly effective for the column-to-footing joint (GGSS-3), as shown in **Fig. 3**. As expected, the cast-in-place joints performed the best.

(continued on Page 7)

Grouted Splice Sleeve Connectors for ABC Bridge Joints in High-Seismic Regions (cont.)



(a)



(b)

Figure 3. Specimen GGSS-3 at a drift ratio of 7%: (a) overall view; (b) footing dowel at joint interface.

Even though AASHTO Specifications currently do not allow the use of connectors in the plastic hinge region, all joints tested in this research demonstrated acceptable ductility for moderate-seismic regions and some joints demonstrated acceptable ductility for high-seismic regions. The GSS connectors studied in this research were promising, especially when considering the time-saving potential of joints constructed using ABC methods; however, the different hysteretic performance and reduced displacement ductility of various alternatives compared to the cast-in-place joints must be accounted for in design.

Acknowledgments: This study is described further, including recent reports, on the [TPF-5\(257\)](#) website. The authors acknowledge the financial support of the Utah, New York State and Texas Departments of Transportation, and the Mountain Plains Consortium. The authors also acknowledge the assistance of Joel Parks, Dylan Brown, and Mark Bryant of the University of Utah.

For more information, please contact Dr. Chris Pantelides from the University of Utah (c.pantelides@utah.edu), Joshua Sletten of UDOT's Structures Division (jsletten@utah.gov) or Jason Richins of UDOT's Research Division (jrichins@utah.gov).

Comparison of Wintertime Asphalt and Concrete Pavement Surface Temperatures in Utah

Because winter maintenance is so costly, UDOT personnel asked researchers at Brigham Young University (BYU) to determine whether asphalt or concrete pavements require more winter maintenance. Differing thermal properties suggest that, for the same environmental conditions, asphalt and concrete pavements will have different temperature profiles. Climatological data from 22 environmental sensor stations (ESSs) near asphalt roads and nine ESSs near concrete roads were used to determine which pavement type has higher surface temperatures in winter.

Twelve continuous months of climatological data were acquired from the road weather information system operated by UDOT, and erroneous data were removed from the data set. In order to focus on the cold-weather pavement surface temperatures, a winter season was defined as the period from November through April, and the data were divided into time periods that were based on sunrise and sunset times to match the solar cycle.

To predict pavement surface temperature, a multiple linear regression was performed with input parameters of pavement type, time period, and air temperature. As shown in Table 1, the statistical analysis predicting pavement surface temperatures showed that, for near-freezing conditions, asphalt is better in the afternoon, and concrete is better for other times of the day. *However, neither pavement type is better, on average, across the locations studied in this research. That is, asphalt and concrete are equally likely to collect snow or ice on their surfaces, and both pavements are expected to require equal amounts of winter maintenance, on average.*

Table 1: Air temperatures corresponding to freezing pavement surface temperatures (multiple sites)

Time Period	T _{air} at T _{pavement} = 0°C (32°F)		ΔT _{air} °C (°F)	Requires Less Winter Maintenance
	Asphalt	Concrete		
Late Morning	-3.5 (25.8)	-3.7 (25.3)	0.2 (0.4)	Concrete
Early Afternoon	-7.2 (19.1)	-6.2 (20.9)	-1.0 (-1.8)	Asphalt
Late Afternoon	-3.4 (25.9)	-3.0 (26.6)	-0.4 (-0.7)	Asphalt
Evening	-2.0 (28.4)	-2.2 (28.0)	0.3 (0.4)	Concrete
Night	-1.4 (29.3)	-2.0 (28.5)	0.5 (0.8)	Concrete
Early Morning	-1.3 (29.6)	-1.8 (28.8)	0.5 (0.8)	Concrete
Average	-3.1 (26.4)	-3.1 (26.4)	0.0 (0.0)	Neither

To supplement these analyses, which provided useful information about average pavement temperatures across the statewide pavement network, additional analyses of asphalt and concrete pavement surface temperatures were performed for a particular location in a mountainous region of northern Utah more typical of canyon areas. Asphalt and concrete pavement surface temperatures were directly compared at a location on U.S. Route 40 near Heber where asphalt and concrete meet end to end at the base of a mountain pass. As shown in Figure 1, an ESS was installed to facilitate monitoring of asphalt and concrete pavement surface temperatures, as well as selected climatic variables, at the site.



Figure 1: ESS at US-40 research site near Heber

Data collected during the three winter seasons from 2009 to 2012 were analyzed in this research, and the same months and time periods used in the previous study were applied in this analysis as well. To compare the surface temperatures of the concrete and asphalt pavements during freezing conditions, multivariate regression analyses were performed. Equations were generated for three response variables, including the asphalt surface temperature, concrete surface temperature, and difference in temperatures between the asphalt and concrete surfaces.

(continued on Page 9)

Comparison of Wintertime Asphalt and Concrete Pavement Surface Temperatures in Utah (cont.)

The statistical models developed in the analyses show that the surface temperature of both asphalt and concrete pavement increases with increasing air temperature and decreases with increasing relative humidity and wind speed, and that the difference in pavement temperatures decreases with decreasing air temperature. For the studied site, the data indicate that concrete pavement will experience freezing before asphalt pavement for all time periods except late afternoon, when the pavement types are predicted to freeze at the same air temperature (see Table 2). *Therefore, for material properties and environmental conditions similar to those evaluated at this US-40 site, asphalt would require less winter maintenance, on average, than concrete.*

Table 2: Air temperatures corresponding to freezing pavement surface temperatures (US-40 Heber site)

Time Period	T _{air} at T _{pavement} = 32°F (°F)		ΔT _{air} (°F)	Requires Less Winter Maintenance
	Asphalt	Concrete		
Late Morning	24.1	25.8	-1.7	Asphalt
Early Afternoon	17.2	18.2	-1.0	Asphalt
Late Afternoon	27.8	27.8	0.0	Neither
Evening	29.6	30.0	-0.4	Asphalt
Night	29.9	30.7	-0.8	Asphalt
Early Morning	29.5	30.3	-0.9	Asphalt
Average	26.4	27.2	-0.8	Asphalt

Due to the interactions among albedo, specific heat, and thermal conductivity, the actual thermal behavior of a given pavement will depend on the material properties and environmental conditions specific to the site. As shown in this research, concrete pavement can be warmer than asphalt, which is typical of the statewide pavement network, on average, during late morning, evening, night, and early morning. However, the research also clearly shows that, in mountainous regions of northern Utah more typical of canyon areas, engineers may expect asphalt pavement to be warmer than concrete, or equal in temperature to it, during all time periods at sites that receive direct sun exposure, such as the one on U.S. Route 40 that was studied in this research. At such sites, selection of asphalt pavement may facilitate reduced winter maintenance costs; however, though statistically significant, relatively small differences in temperature between asphalt and concrete pavement surfaces may not warrant differences in actual winter maintenance

practices. *Other factors beyond pavement type, such as rutting and surface texture, may more strongly affect winter maintenance and should also be considered.*

The results of the statewide comparison of wintertime temperatures of asphalt and concrete pavements, as well as the specific results for the US-40 site near Heber, are detailed in two separate research reports available on the Research Division website.

For additional information, contact Dr. Guthrie of BYU (guthrie@byu.edu), Lynn Bernhard (lynnbernhard@utah.gov) of UDOT Central Maintenance, Scott Andrus (scottandrus@utah.gov) of UDOT Central Materials, or David Stevens (davidstevens@utah.gov) of the Research Division.

Research Division Comings and Goings

Russ Scovil, P.E. was a Project Manager with UDOT's Research Division for the past 2 years. He recently accepted an opportunity to broaden his horizons with UDOT's Traffic & Safety Division with responsibilities including managing certification for the Flagger Program, Statewide ADA Resource, and handling certifications for Work Zones and Barriers and Crash Cushions, as well as serving as a resource for both.

Russ coordinated our 2014 Research Workshop and brought a positive and energetic dynamic to our team. We appreciate his many contributions and wish him well in his new assignment.



Thomas Hales, S.E. has joined UDOT's Research Division as a Project Manager. Tom has been with UDOT for almost 6 years. He spent the last 4 years as a Design Lead in the Structures Division and before that worked as a Roadway Designer in our Region One office. He earned a Bachelor's Degree in Civil Engineering from Utah State University, a Master's Degree in Civil Engineering from the University of Utah, and is currently finishing up work on a Doctorate's Degree in Civil Engineering from the University of Utah. Prior to his time with UDOT he worked for over 15 years as a Structural Engineer in the design of commercial, industrial, and residential buildings and structures.

We're very pleased to welcome Tom to the Research team and know he'll be a great asset to our customers and UDOT staff.



Research Calendar of Events

LEADERSHIP BOOK DISCUSSION

The second leadership book discussion with Shane Marshall will be held on Thursday, August 21 at 11:00 AM in the Njord Conference Room of the UDOT Complex for all interested UDOT employees. The intent of these discussions is to share valuable and insightful lessons that support UDOT's culture of innovation and improvement. The book being discussed is ***Help Them Grow or Watch Them Go: Career Conversations Employees Want*** by Beverly Kaye and Julie Winkle Giulioni. Contact Joni DeMille in the UDOT Library (jdemille@utah.gov) to borrow a print or audio copy of the book. The presentation will be broadcast to the regions.

RESEARCH FUNDING OPPORTUNITIES (click to see the full document)

NCHRP Highway IDEA Proposals, DUE on September 1, 2014

ACRP Synthesis of Practice Topics, DUE on September 1, 2014

NCHRP FY 2016 Problem Statements, DUE on September 15, 2014

Safety IDEA Proposals, DUE on September 16, 2014

WEBINARS (click to see webinar details)

Title	Day/Date	Time
Gaussian Process Metamodels for Sensitivity Analysis of Traffic Simulation Models (TRB)	Wednesday, July 9	10:00 AM – 11:30 AM
Transportation Quality Assurance Terms and Improved Communications Practices (TRB)	Thursday, July 10	11:00 AM – 1:00 PM
SHRP 2 Tuesdays Webinar: Analysis of In-Vehicle Field Study Data and Countermeasure Implications (TRB)	Tuesday, July 22	8:00 AM – 9:30 AM
Climate Change, Extreme Weather Events and the Highway System (TRB)	Monday, July 28	12:00 PM – 1:30 PM
The Tenth National Asset Management Conference Post Conference Webinar: Transit State of Good Repair (TRB)	Tuesday, July 29	1:00 PM – 2:30 PM
Preparing State Transportation Agencies for an Uncertain Energy Future (TRB)	Thursday, July 31	11:00 AM – 1:00 PM
Network Level Pavement Friction Testing Policy and Promising Practices (TRB)	Tuesday, August 5	12:00 PM – 1:30 PM
Is North America Ready for the Turbo Roundabout: Development and Advantages With and Without Raised Curbs (TRB)	Wednesday, August 20	10:00 AM – 12:00 PM
Ternary Mixes: Past, Present, and Future (TRB)	Tuesday, August 26	10:00 AM – 11:30 AM
The Fundamentals of Public Speaking	Friday, July 18 or Monday, August 11	11:00 AM – 12:00 PM 2:00 PM – 3:00 PM
Leading People through Change: Avoiding 6 Common Mistakes	On Demand	On Demand